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Simplex Designer's Kit

Jameco Part Number 169893

INDUSTRIAL FIBER OPTICS

INTRODUCTION

This fiber optic kit contains all the components needed to construct a 125 kilobit per second 10-meter data link. The distance between the transmitter and receiver can be increased by purchasing additional cable and adding it to the fiber in this kit, using the retention clips and splice (see *Parts List* below).

The transmitter and receiver electronic circuits for this data link are both shown in **Figure 1**. The inputs and outputs are compatible with any TTL/CMOS logic operating from a +5 volt supply. The assembled data link is ideal for applications such as constructing special purpose data links for computer mainframe links to printers, connecting digital process controllers or constructing optical modems.

WARRANTY INFORMATION

This kit was carefully inspected before leaving the factory. If any components were damaged in shipping, *Industrial Fiber Optics* will replace them at its discretion. Since soldering and incorrect assembly can damage electrical components, no warranty can be made after assembly has begun. If any parts become damaged, replacements may be obtained from most radio/electronics supply shops. Refer to the *Parts List* below for identification.

Industrial Fiber Optics recognizes that responsible service to our customers is the basis of our continued operation. We welcome and solicit your feedback about our products and how they might be modified to best suit your needs. For information on other fiber optic components and supplies please see our web site http://www.i-fiberoptics.com.

PARTS LIST

	P/N	Description	Color-code
C1		.01 µf mylar capacitors (2)	
F1	IF-C-E1000	10 meters 1000 µm plastic fiber	
F2	228087-1	Simplex assemblies (4)	
F3	228042-1	Simplex bulkhead receptacles (2)	
F4	228046-1	Retention clips (2)	
F5	228051-1	Splice	
H1		Polishing paper	
H2		2-56 3/8" machine screws (2)	
H3		2-56 hex nuts (2)	
LED1	IF-E97	Fiber optic red LED	Blue housing, red dot
PD1	IF-D95T	Fiber Optic Photo-Schmitt	Black housing, yellow dot
PWB1		Printed wiring boards (2)	
Q1	2N3904	NPN transistor	
R1	1 K	1/4 watt resistor	Brown Black Red
R2	150	1/2 watt resistor	Brown Green Brown
U1	4069	Hex CMOS inverter ICs (2)	

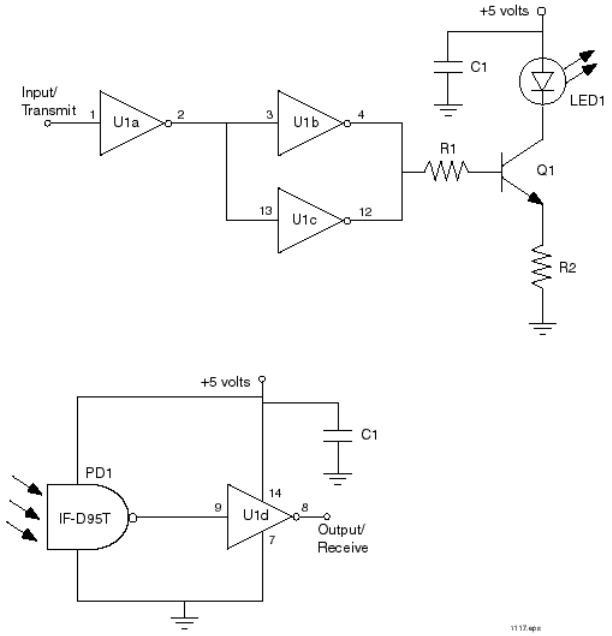


Figure 1. Transmitter circuit (top); Receiver circuit (bottom).

ASSEMBLY

The transmitter and receiver circuits for this kit use identical printed wiring boards (PWBs). Each PWB contains the transmitter and receiver circuitry. Assemble the transmitter and receiver circuits following the steps below. Identify the side of the PWB marked "component side" and install all components on this side for both circuits. Solder and trim the leads after each step. (Components R3, R4 and C2, marked on the printed wiring boards, are not included or required for this data link.)

Transmitter

1. Install R1 and R2 and solder them in place.
2. Install C1 and solder.
3. Play close attention to the legend detail on the PWB and install Q1 appropriately. If you need further clarification, refer to the transmitter circuit schematic and **Figure 2**.
4. Install LED1 placing the leads through the pads and securing it with a 2-56 3/8" screw and hex nut. Solder each lead.
5. Match the outline of U1 (4069) to the legend outline on the PWB and solder in place.
6. Connect electrical leads for +5 volts, ground, and input to the pwb as your application requires.

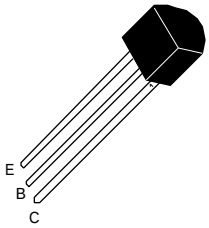


Figure 2. TO-92 Transistor package.

Receiver

1. Install C1 and solder.
2. Using a clipped lead from the capacitor, form a 12 mm (1/2 inch) jumper wire and install across the pads designated for R4.
3. Install PD1 placing the leads through the pads and securing with a 2-56 3/8" screw and hex nut. Solder each lead.
4. Match the outline of U1 (4069) to the legend outline on the PWB and solder in place.
5. Solder a short length of wire across the solder pads designated for R4.
6. Connect electrical leads for +5 volts, ground, and input as your application requires.

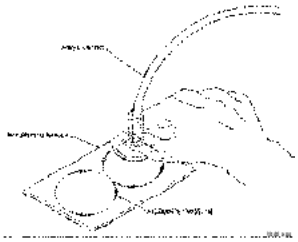
Fiber Connectors and Splices

For instructions on installing the simplex assemblies, retention clips and splice on the fiber, see enclosed *Amp Technical Bulletin IS 2974*.

After the splices and connectors are completed, the fiber can be checked for continuity. Illuminate one end of the fiber with a light and examine the other end. A white glow should be evident. If not, check splices and/or connectors.

LED/Photo-Schmitt Fiber Terminations

To properly terminate the ends of the fiber to be inserted into the fiber optic LED and Photo-Schmitt, complete the following steps:



1. Cut off the ends of the cable with a single-edge razor blade or sharp knife. Try to obtain a precise 90-degree angle (square).
2. Wet the gray side of the polishing paper with water or light oil and place it on a flat, firm surface. Hold the optical fiber upright, at right angles to the paper, and polish the fiber tip with a gentle "figure-8" motion. You may get the best results by supporting the upright fiber against some flat object such as a portion of the printed wiring board.
3. Loosen the cinch nuts on the LED and Photo-Schmitt and insert one end of the fiber into each. Lightly tighten the cinch nuts with your fingers. ***Do not overtighten or use pliers on the cinch nuts.***

OPERATION

Connect a +5 volt power supply to the transmitter and receiver along with the input and output electrical connections. Turn on the power supply and data transmission. The data link will now be operating.

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